

Metro Water Services

Long-Range Biosolids Management Plan Comprehensive Odor Control Study

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Overview

- Welcome
- MWS staff – Scott Potter, David Tucker, Ron Taylor
- Purpose today is to share plans that:
 - Signify a positive change in direction for MWS
 - Build on the results of two studies that invested significant time and effort to explore the best available options
- The improvements planned will:
 - Make us a better neighbor
 - Improve the way we deliver services
 - Allow us to be better stewards of the environment
 - Represent wise investment of available financial resources

Two Projects

One Goal

To become a better neighbor to the neighborhoods surrounding MWS wastewater treatment plants

PROJECT 1 – Long-Range Biosolids Management Plan

- Existing facilities are obsolete and require replacement
- Since incineration ceased in 1994, hauling untreated sludge to landfill has been primary method of disposal
- MWS experience with disposal alternatives
- Sludge processing is a major odor source
- Long range management plan undertaken in late 2001

Two Projects

One Goal

To become a better neighbor to the neighborhoods surrounding MWS wastewater treatment plants

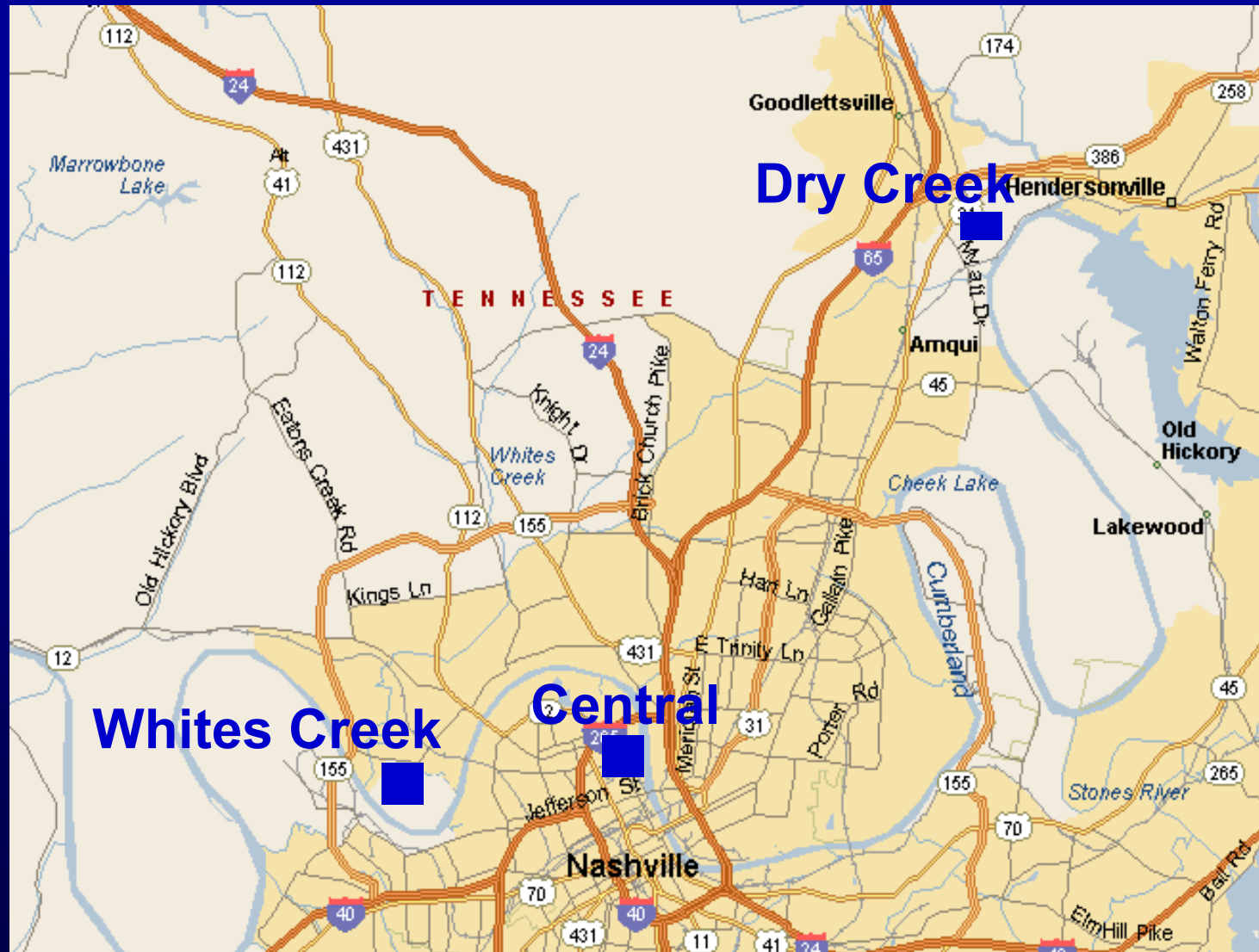
PROJECT 2 – Comprehensive Odor Control Study

- Historic problems with off-site odors at Central and Dry Creek
- Odor control study undertaken in late 2001:
 - First of its kind for Metro
 - Complements ongoing program to address collection system odors
 - Goal: To recommend treatment options for odor sources impacting neighborhoods

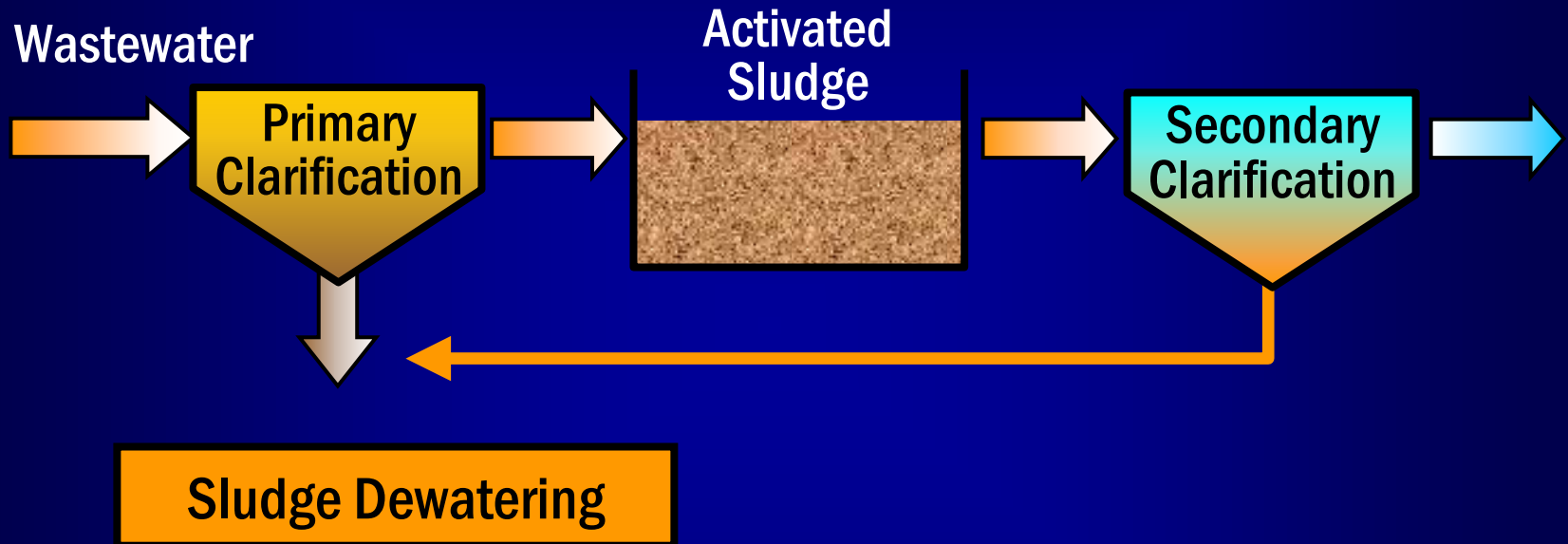
Goals For Today

1. Distinguish between production of sludge and biosolids
2. Explain the wastewater treatment process and typical sources of odors in treatment plants
3. Review Odor Control Study methodology and recommendations
4. Review Long-Term Biosolids Management Plan methodology and recommendations

MWS Wastewater Treatment Plants



What We Do Now Produce Sludge



Untreated sludge must be disposed of in a landfill or by incineration unless additional treatment is provided.

Solids Processing Primary Clarifiers



Solids Processing Aeration Basins



Solids Processing Secondary Clarifiers



Sludge Dewatering Belt Filter Press



Solids Processing Belt Filter Cake



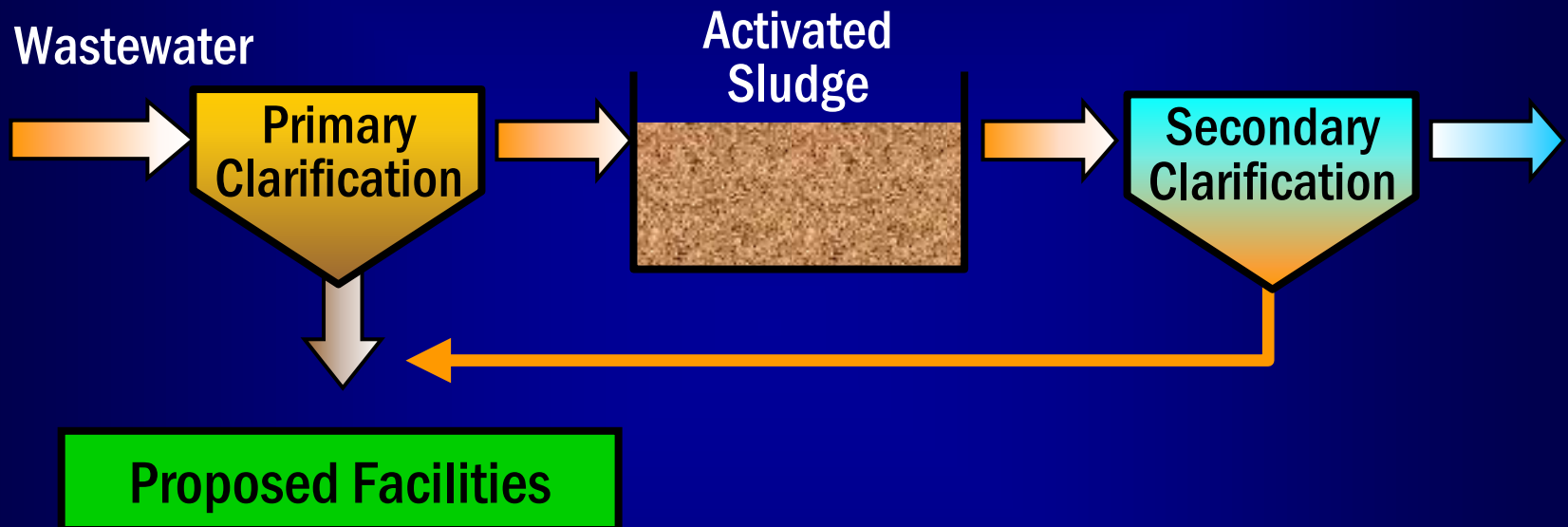
Solids Processing

Transport to Landfill



What We Propose

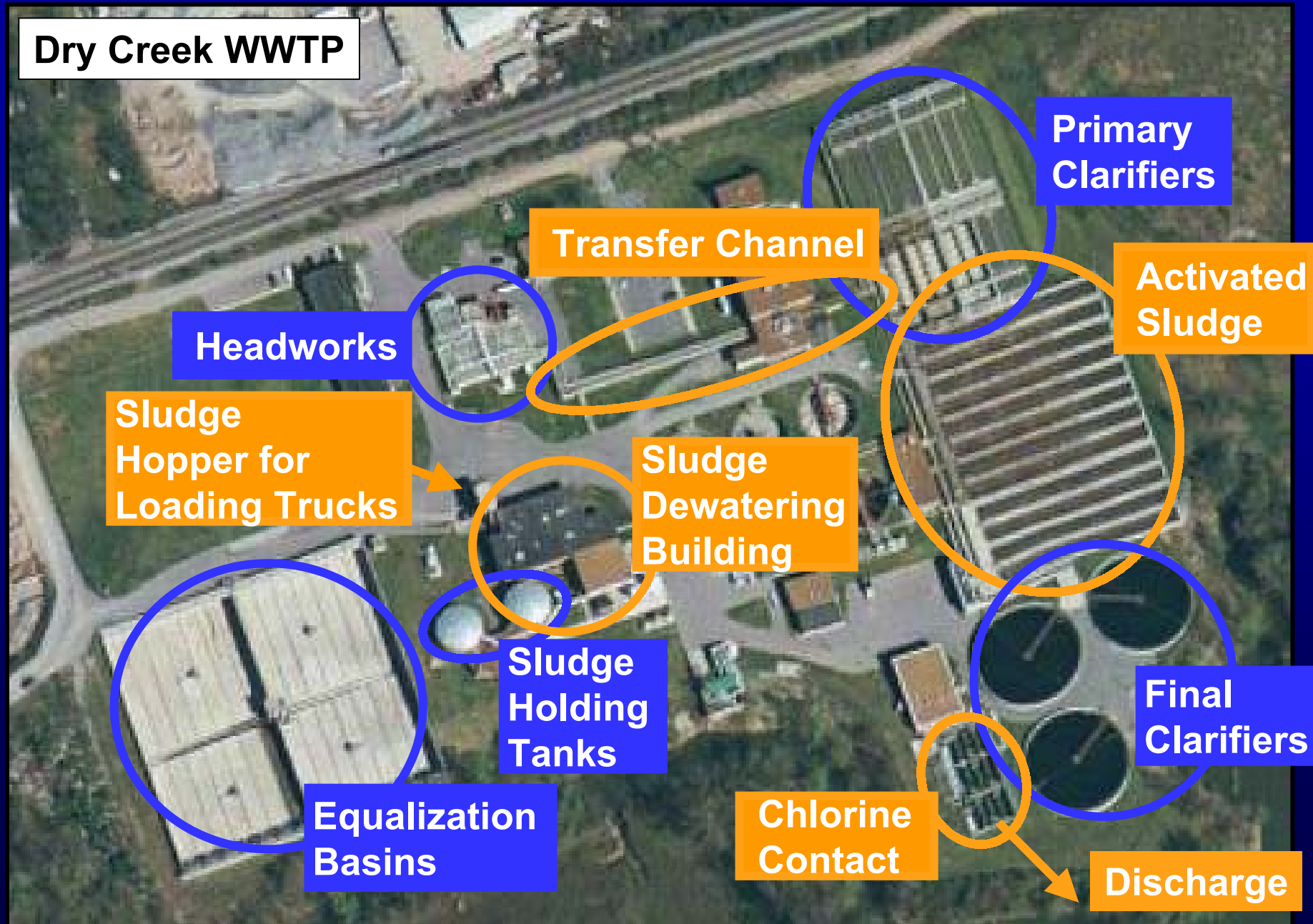
Produce Biosolids



Biosolids are residuals that have been further treated to meet EPA standards for beneficial use.

Water Treatment Plant Potential Odor Sources

Dry Creek WWTP



Comprehensive Odor Control Study

Goal:

- Contain odors onsite to minimize impact to neighbors

Study undertaken in late 2001 to:

- Identify odor sources
- Quantify emission rates
- Estimate transport distances
- Recommend treatment options

Identify Potential Odor Sources

Central WWTP



Source Sampling

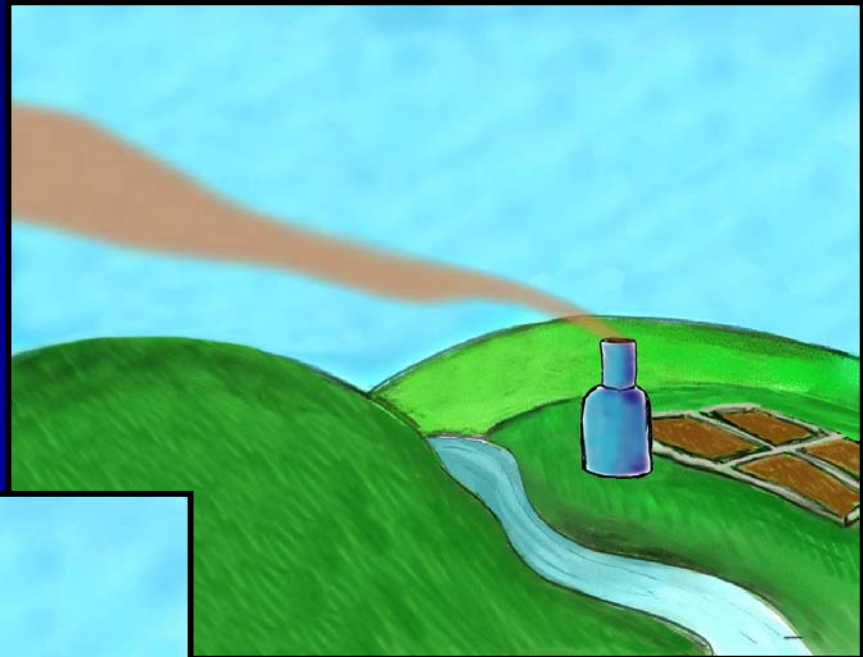


Sensory Analysis



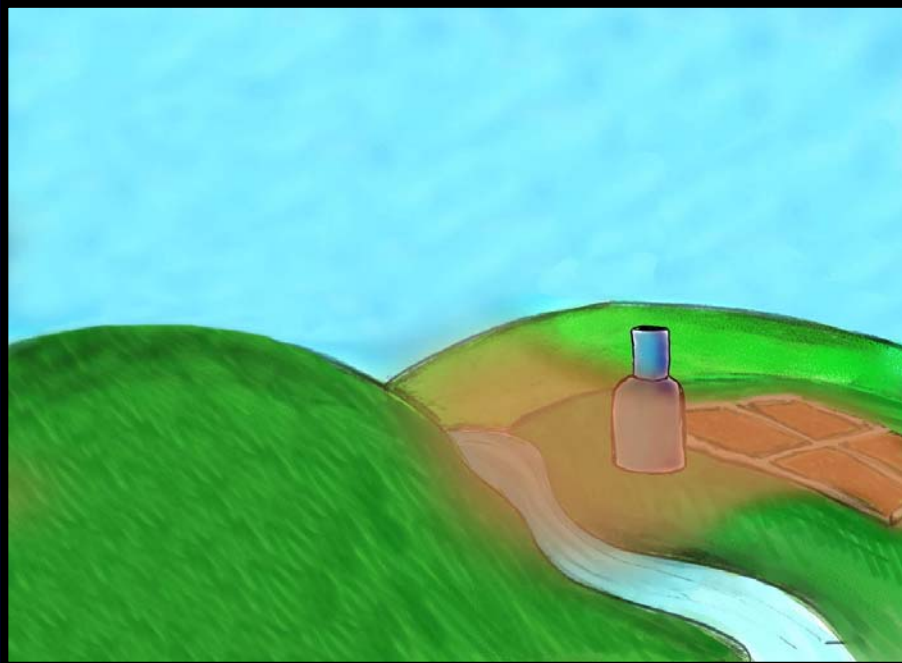
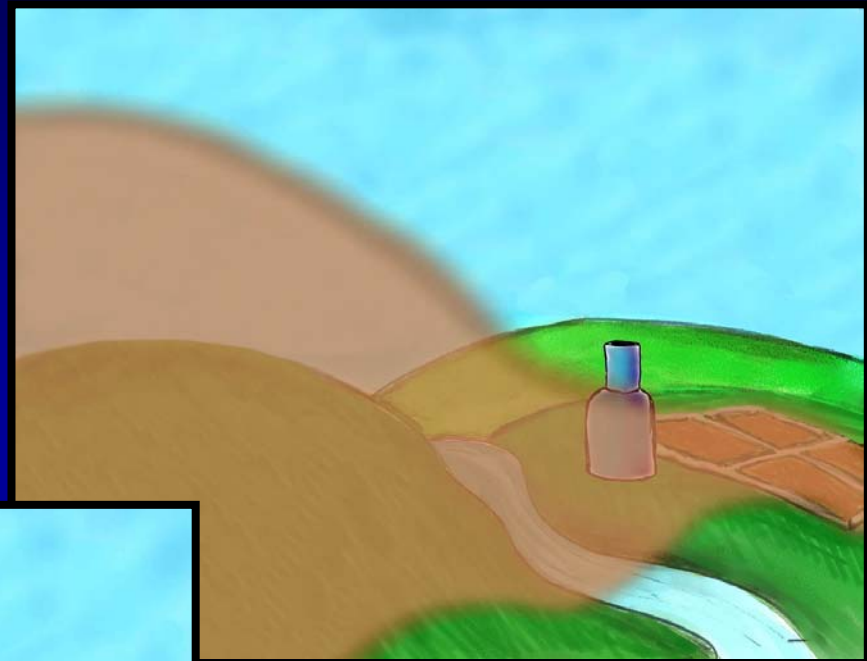
Odor Emission Rate

Point Source



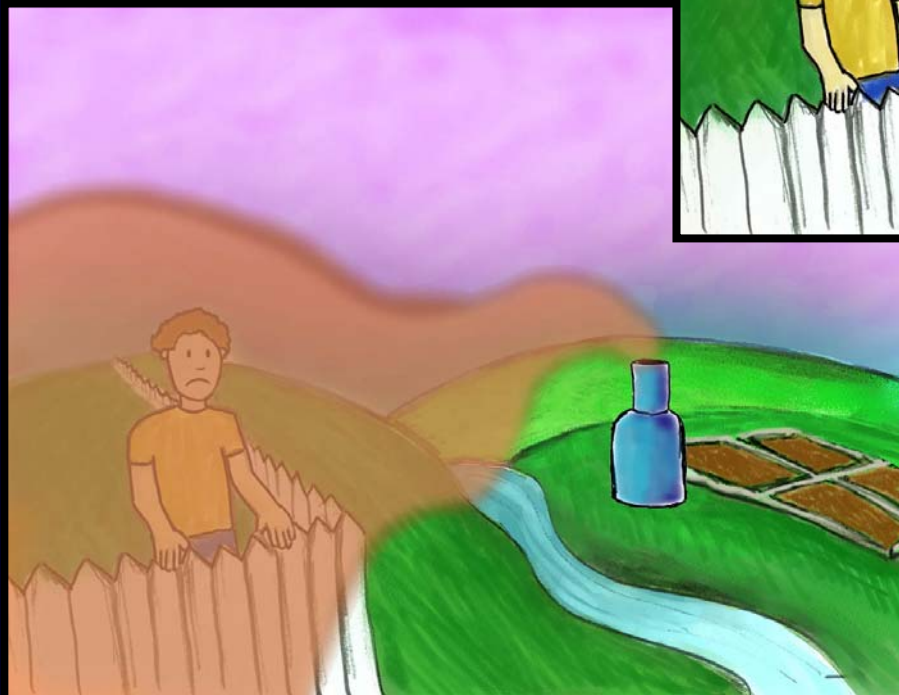
Odor Emission Rate

Area Source



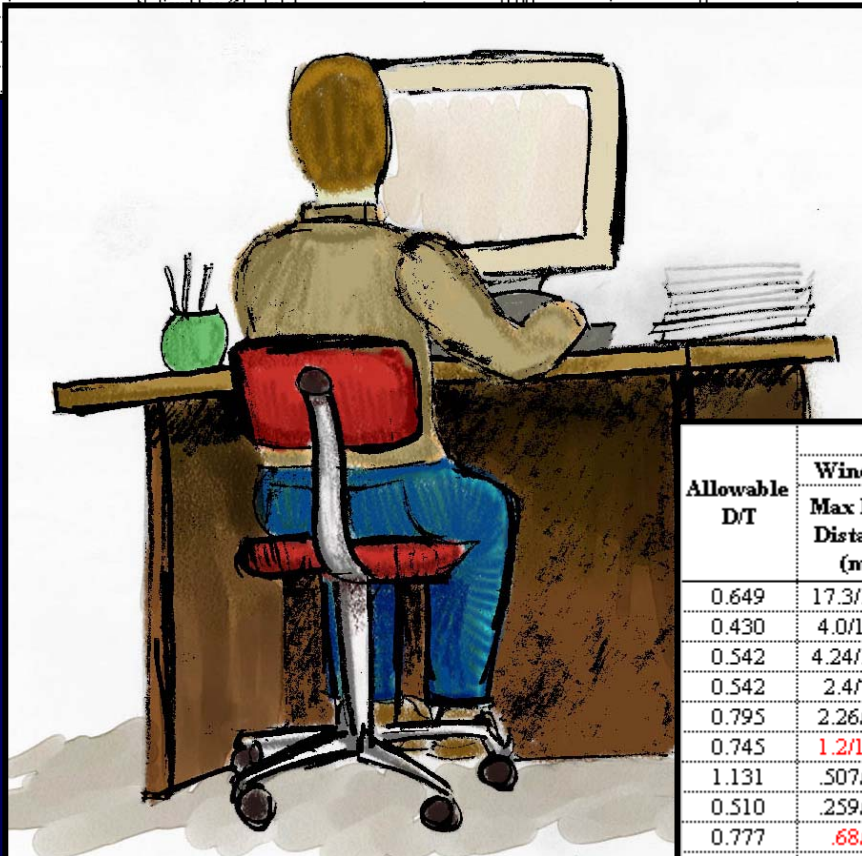
Environmental Factors

Weather



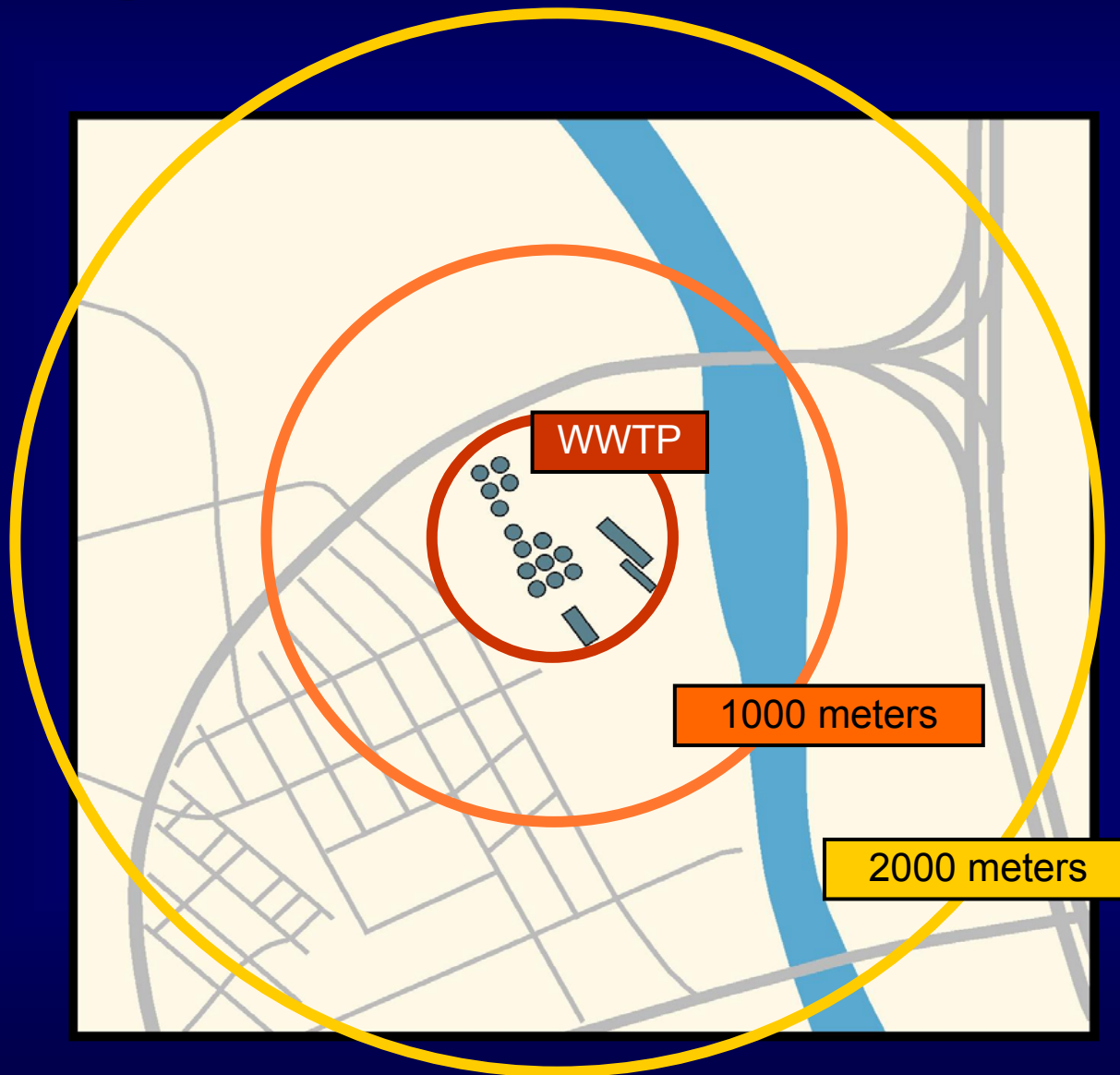
Modeling

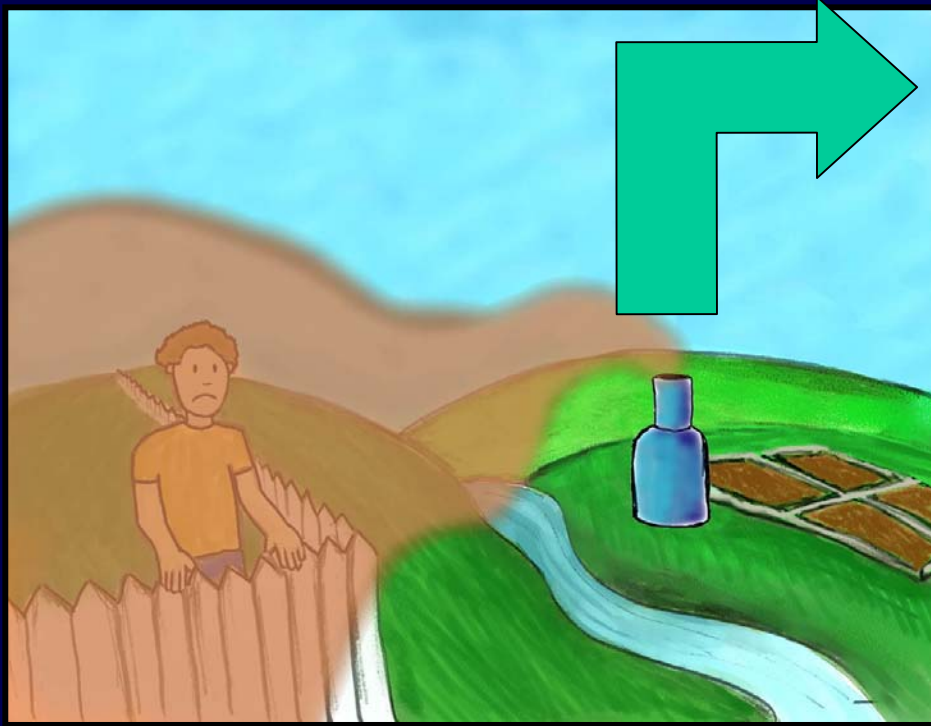
Sample No.	Sample Location	Odor Emission	Odor Emission	Butanol Odor
		Rate (O.U.-ft ³ /min X 10 ⁶)	Rate (O.U.-m ³ /sec)	Emission Rate (gr/sec)
1	N. Scrubber #1 - Inlet	0.00	0	0.00
2	N. Scrubber #1 - Mid Stage	0.00	0	0.00
3	N. Scrubber #1 - Exhaust	3.14	1,480	10.13
4	N. Scrubber #2 - Inlet	0.00	0	0.00
5	N. Scrubber #2 - Mid Stage	0.00	0	0.00
6	N. Scrubber #2 - Exhaust	7.69	3,629	8.83
7	N. Scrubber #2 - Inlet	0.00	0	0.00
8	N. Scrubber #2 - Mid Stage	0.00	0	0.90
9	N. Scrubber #2 - Exhaust	0.00	0	0.00
10	N. Scrubber #2 - Inlet	0.00	0	2.19



Allowable D/T	Stability Class 6					
	Wind Speed = 1 m/s		Wind Speed = 2 m/s		Wind Speed = 4 m/s	
	Max D/T / Distance (m)	Distance To D/T=1 (m)	Max D/T / Distance (m)	Distance To D/T=1 (m)	Max D/T / Distance (m)	Distance To D/T=1 (m)
0.649	17.3/1160	>2000	17.2/776	>2000	37.1/318	>2000
0.430	4.0/1184	>2000	3.74/823	>2000	8.2/332	>2000
0.542	4.24/1510	>2000	4.47/960	>2000	7.35/463	>2000
0.542	2.4/700	>2000	4.49/312	>2000	1.19/125	1550
0.795	2.26/848	>2000	1.96/641	1950	3.36/308	1380
0.745	1.2/1000	1700	.88/828	-	-	-
1.131	.507/700	-	-	-	-	-
0.510	.259/729	-	-	-	-	-
0.777	.68/77	-	-	-	-	-
1.468	1.86/69	120	.933/69	-	-	-

Transport Distance





**Percent
Removal**



Capture Odor and Treat



Treatment Methods

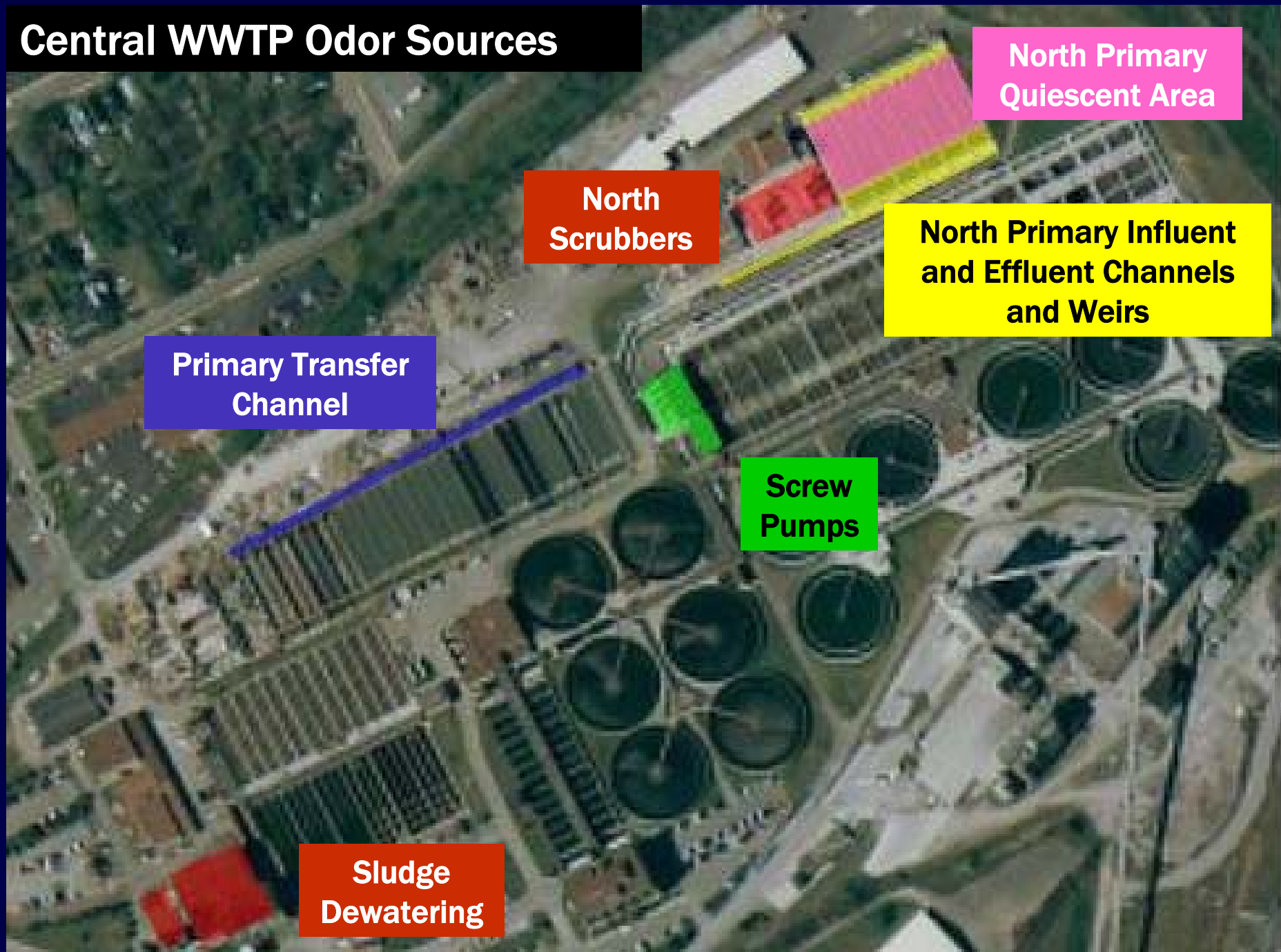
Bio-filter



Packed Bed Scrubber



Central WWTP Odor Sources

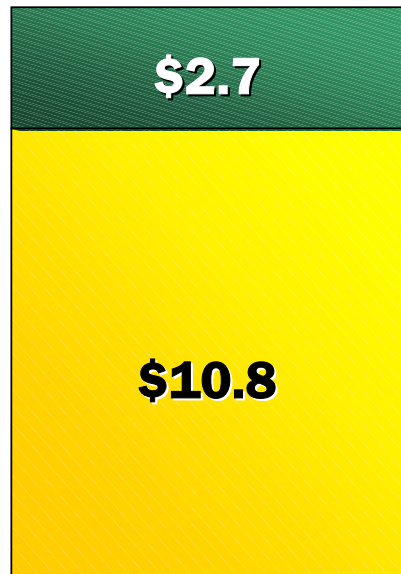


Central WWTP Bio-filters vs. Scrubbers

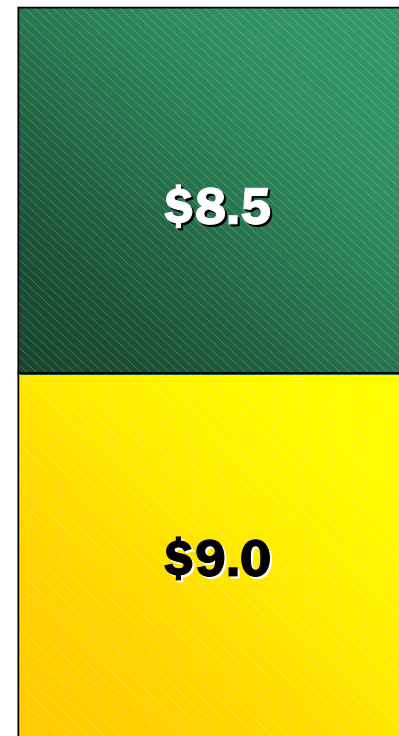
Total Cost – Net Present Value (million \$) over 20 years

■ Operating and Maintenance
■ Capital Investment

Bio-filters
\$13.5



Chemical Scrubbers
\$17.5



Dry Creek WWTP Odor Sources

**Headworks
Scrubber**

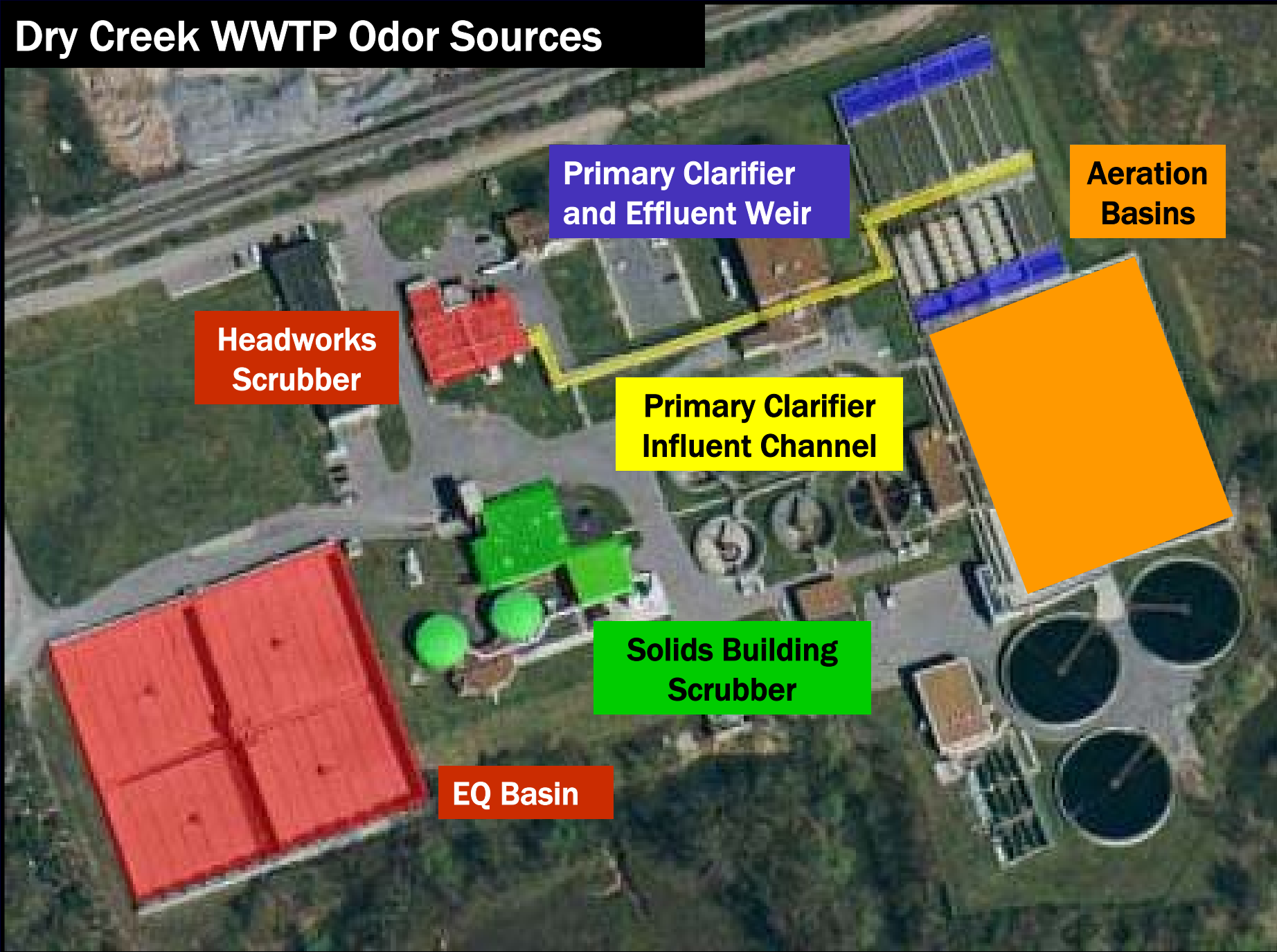
**Primary Clarifier
and Effluent Weir**

**Aeration
Basins**

**Primary Clarifier
Influent Channel**

**Solids Building
Scrubber**

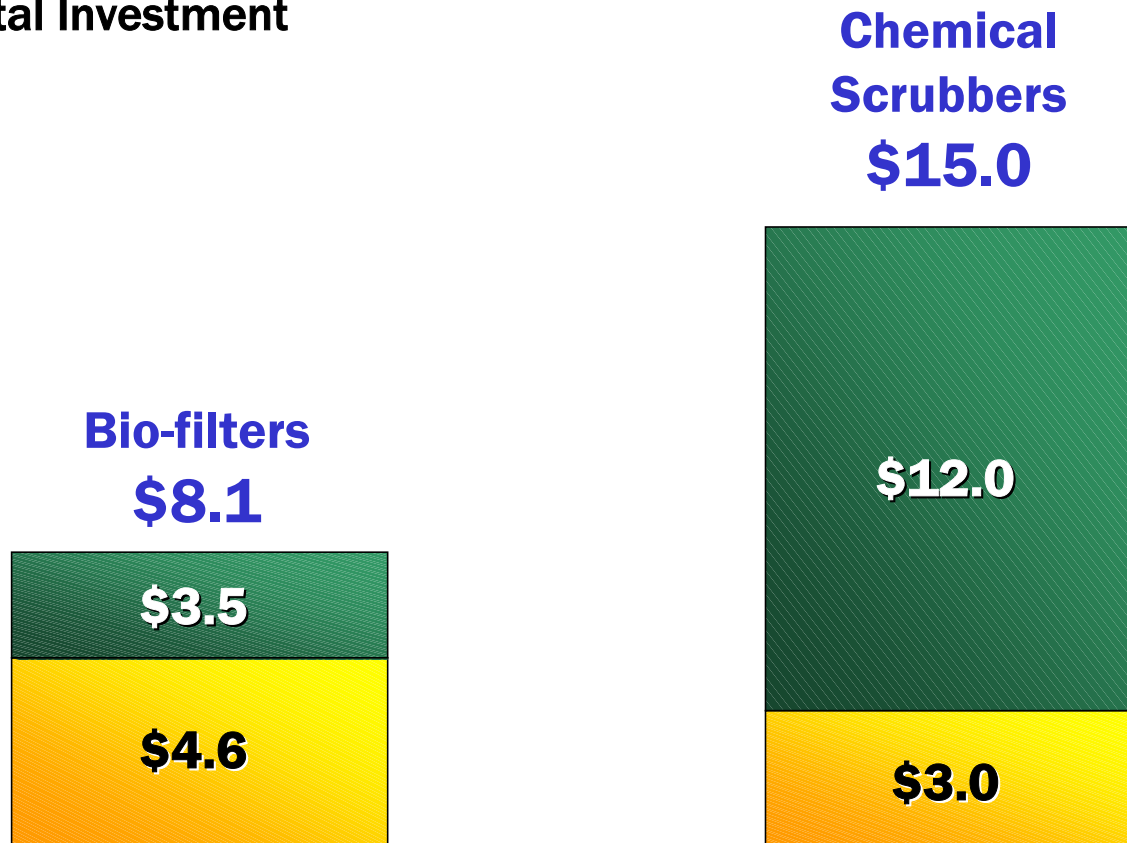
EQ Basin



Dry Creek WWTP Bio-filters vs. Scrubbers

Total Cost – Net Present Value (million \$) over 20 years

■ Operating and Maintenance
■ Capital Investment



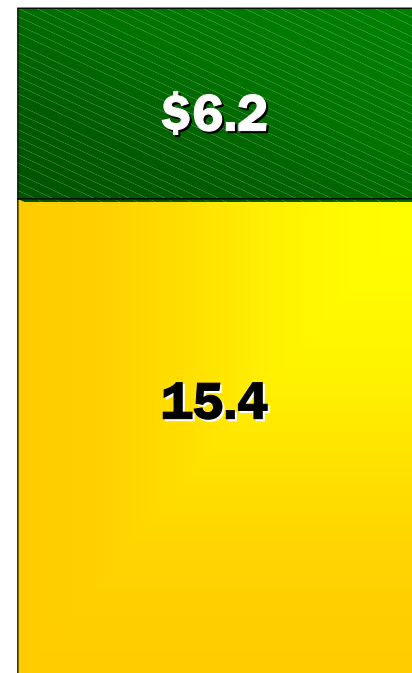
MWS Odor Control Recommendation

Bio-filter Technology

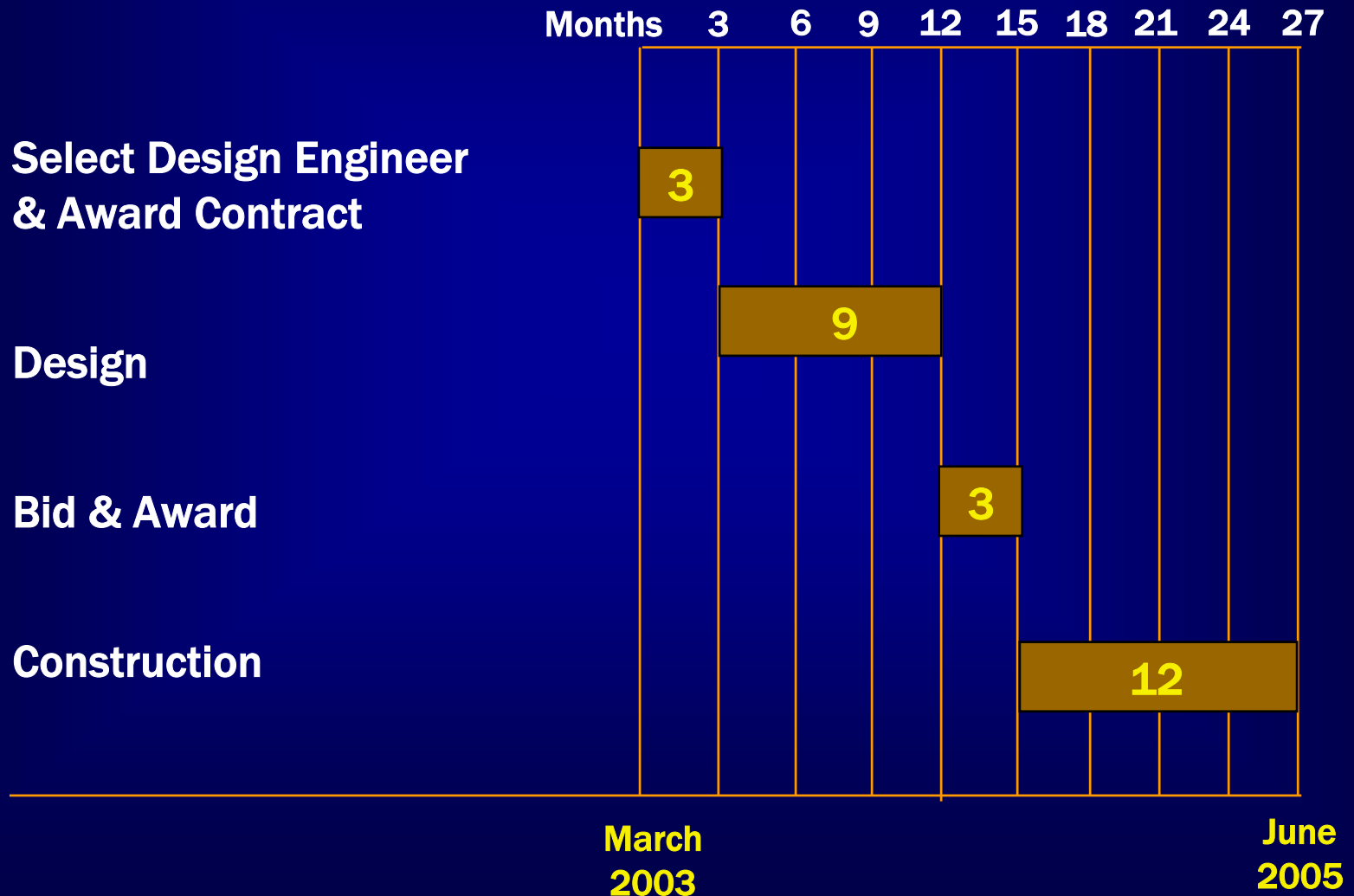


■ Operating and Maintenance
■ Capital Investment

Bio-filters
\$21.6



Odor Control Recommendations Implementation Plan



Long Range Biosolids Management Plan

Goals and Considerations

- Evaluate both disposal and reuse options
- Complement configuration of existing plants
- Use economic and non-economic criteria

Non-economic criteria:

- Neighborhood friendly – odor control, truck traffic
- Environmental considerations
- Reliable, proven technology for large municipality
- Dependence on outside factors

Evaluation Process

Technology Categories

Disposal

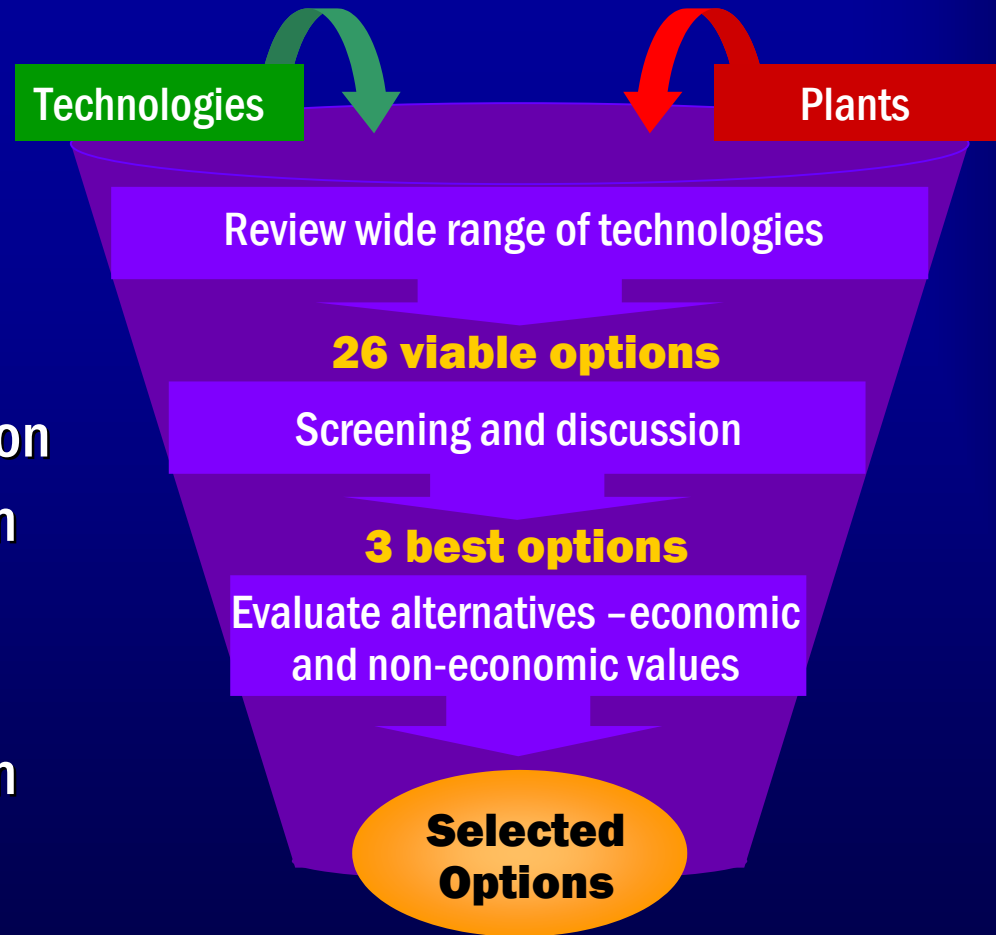
- Landfill
- Incineration

Reuse – Low Grade

- Digestion Stabilization
- Alkaline Stabilization

Reuse - High Grade

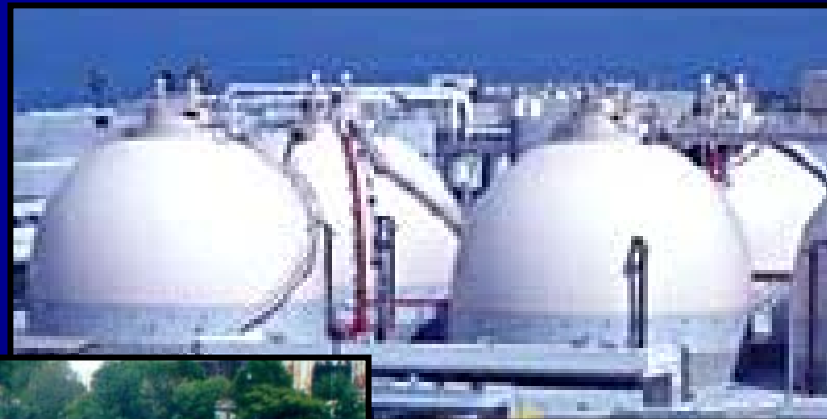
- Composting
- Alkaline Stabilization
- Heat Drying



Biosolids Treatment Technology

Digestion

- Provides stabilization of sludge through biological degradation
- Process requires the absence of air, similar to septic tanks
- Produces methane gas, which can be used as a source of heat or fuel



Biosolids Treatment Technology

Heat Drying

- Provides heat to reduce moisture content through evaporation
- Uses digester gas for majority of fuel
- Reduces volume by 75% and produces pellets for reuse



Comparing The Options

1. Landfill Untreated Solids

- Current process; baseline for comparison
- Requires major investment with minimal gain or benefit

2. Add Digestion at Central & Dry Creek, Landfill Treated Solids

- Opens the door for back-up options for disposal
- First step towards production of a reusable product

3. Add Heat Drying at Central, Reuse End Product

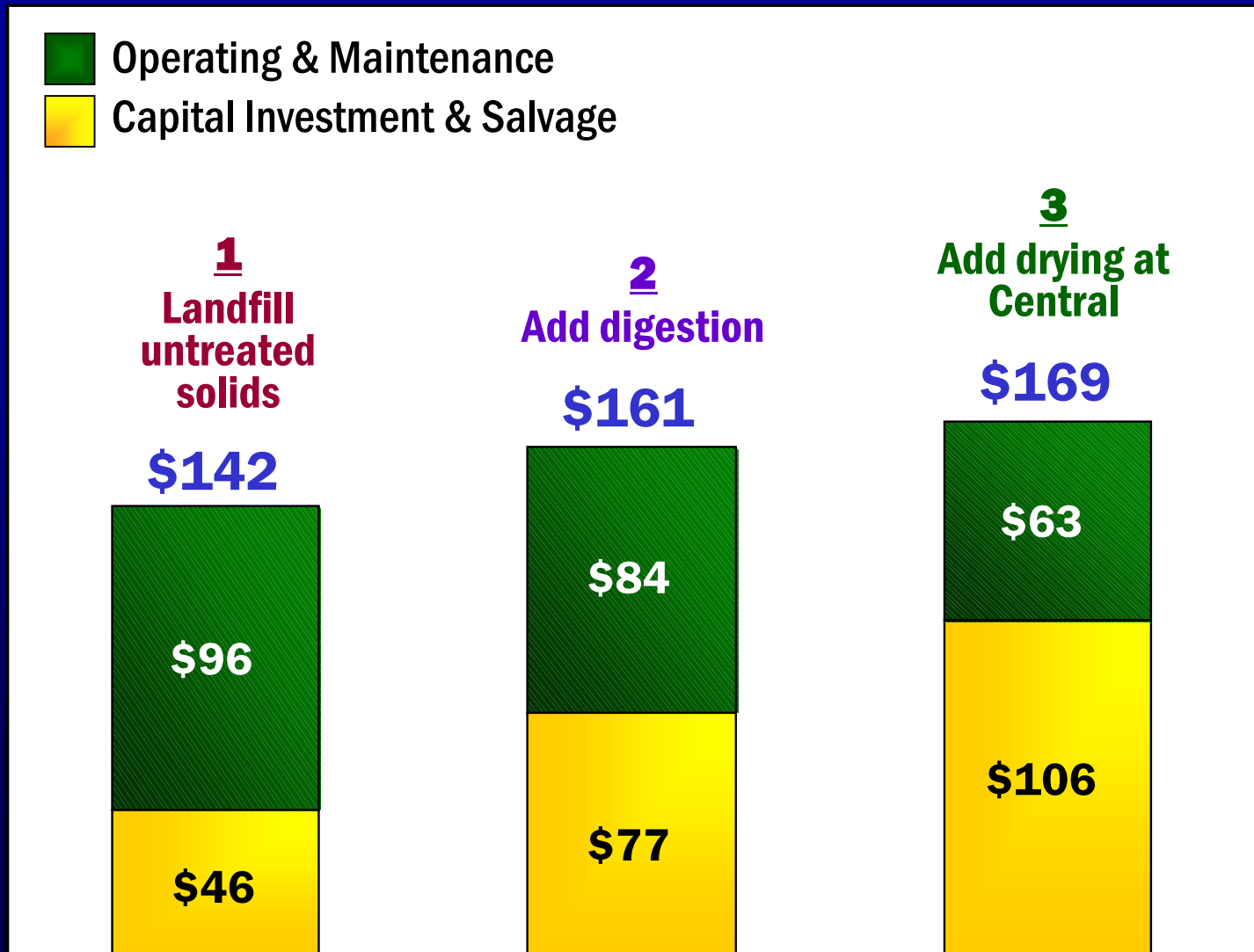
- Produces highest grade, reusable product – 83% of Metro solids become available for reuse
- Reduced operating and maintenance (O&M) costs
- Opportunities to team with the private sector

Comparing The Options

	<u>1</u> Landfill Untreated Solids (Current/Baseline)	<u>2</u> Add Digestion, Landfill Treated Solids	<u>3</u> Add Heat Drying at Central, Reuse End Product
End Product Odor Elimination	Poor	Good	Very Good
Trucks per day (5 day/week)	18	15	4
Reuse	No	No	Yes
Energy Recovery	No	Yes	Yes

Central and Dry Creek Biosolids Plan

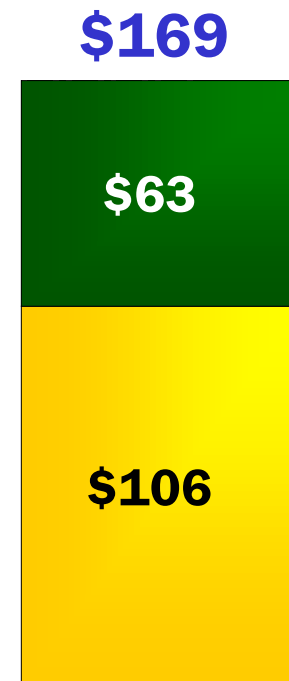
Total Cost – Net Present Value (million \$) over 20 years



MWS Biosolids Recommendation

Add Digestion at Central & Dry Creek, Heat Drying at Central

1. Produces highest grade, reusable product – 83% of Metro solids become available for reuse
2. Reduced operating and maintenance (O&M) costs
3. Opportunities to team with the private sector



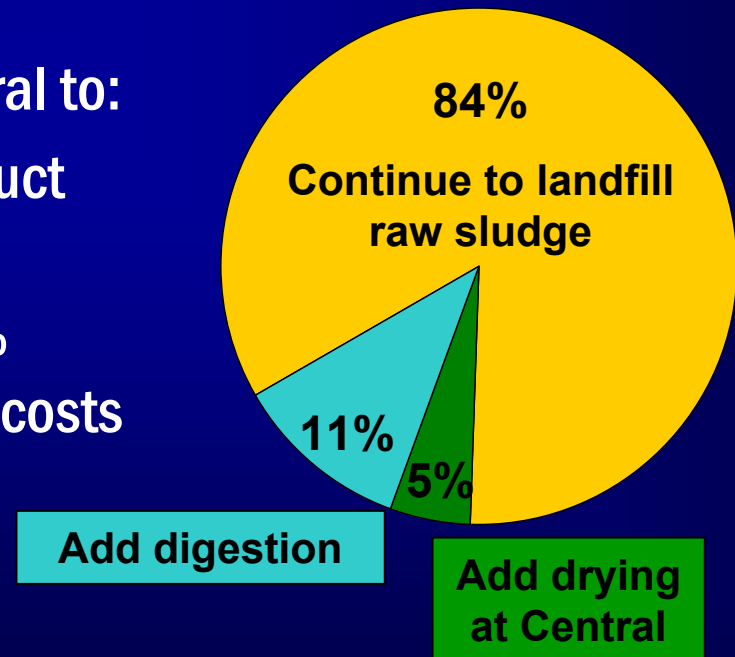
Investment Overview

84% of proposed total investment would be required to continue landfilling raw sludge

11% adds digestion to stabilize sludge for odor control and potential reuse

5% adds heat drying at Central to:

- Produce reusable product to benefit environment
- Reduce volume by 70%
- Lower future operating costs



* Total Investment = Net Present Value (million \$) over 20 years

A Look At Other Communities

What Are Comparable Cities Doing?

Reuse with drying:

- Louisville
- Jacksonville
- Houston
- Sacramento (and dedicated land application)
- Chicago
- Atlanta

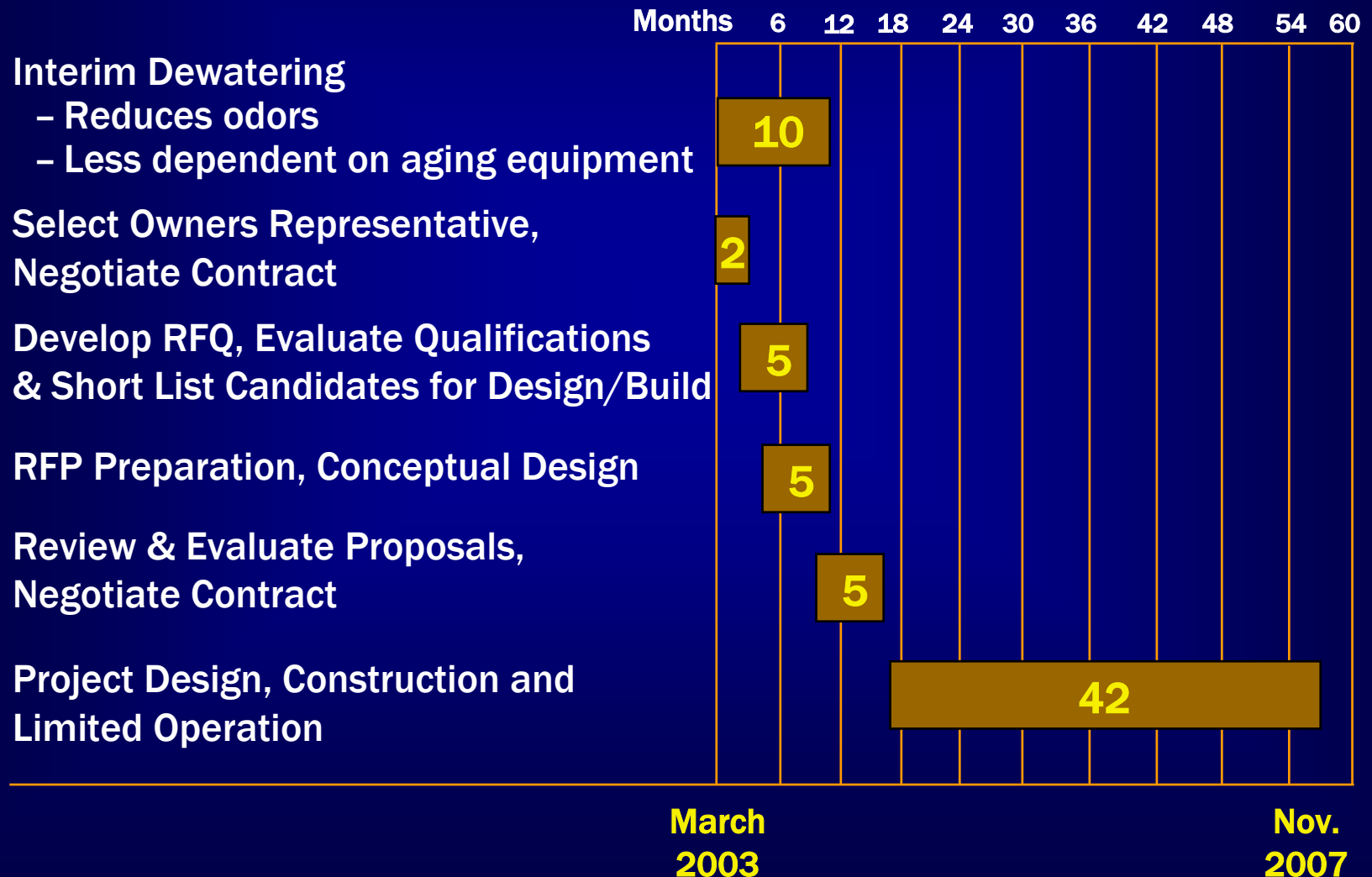
Incineration

- Indianapolis
- Cincinnati

Landfilling

- San Diego

Biosolids Recommendations Implementation Plan



Combined Project Summary

Project Cost	Capital Cost	Total Cost (NPV over 20 years)
Odor Control	\$17 million	\$21 million
Biosolids Plan	\$108 million	\$169 million
Total Project Cost	\$125 million	\$190 million

- **Financing Method: State Revolving Loan**
 - Initial loan amount: \$50 million
 - Loan amendments in successive years totaling \$125 million
 - Interest rate: currently less than 4%
- **Impact on Rates:**
No rate increase required to fund this project

A Positive Change In Direction

- Good news for plant neighbors and ratepayers alike
- Modest incremental investment over that which would be required to replace aging facilities results in:
 - Vastly improved operations
 - Environmentally friendly solutions
 - Sound long-term financial management
- New round of public meetings will be scheduled to share improvements plan with the public

Questions?



Metro Water Services